Information Sheet on Ramsar Wetlands (RIS) – 2006-2008 version

Available for download from http://www.ramsar.org/ris/key_ris_index.htm.

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.

2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.

3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

1. Name and address of the compiler of this form:

FOR OFFICE USE ONLY.

DD MM YY

Designation date | Site Reference Number

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Yenagoa, Bayelsa State
Nigeria

2. Date this sheet was completed/updated:

June 25, 2007

3. Country:

Nigeria

4. Name of the Ramsar site:

The precise name of the designated site in one of the three official languages (English, French or Spanish) of the Convention. Alternative names, including in local language(s), should be given in parentheses after the precise name.

Apoi Creek Forests

5. Designation of new Ramsar site or update of existing site:

This RIS is for (tick one box only)**:**

a) Designation of a new Ramsar site ☑; or

b) Updated information on an existing Ramsar site ❑

6. For RIS updates only, changes to the site since its designation or earlier update:

7. Map of site:
Refer to Annex III of the *Explanatory Note and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

i**) a hard copy** (required for inclusion of site in the Ramsar List): ☑;

ii**) an electronic format** (e.g. a JPEG or ArcView image) ☑;

iii) **a GIS file providing geo-referenced site boundary vectors and attribute tables** ❑.

b) Describe briefly the type of boundary delineation applied:
e.g. the boundary is the same as an existing protected area (nature reserve, national park, etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The boundary of the site follows the existing Forest Reserve rivers as defined on the river-vector, villages given in the RIS (Paratubo and Gharan villages to the North, Apoi, Lobia and Okubie villages to the East, Apoi Creed to the South and Ekinigbene village to the West). it follows River (Pennington River) on the West.

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8. Geographical coordinates (latitude/longitude, in degrees and minutes):
Provide the coordinates of the approximate centre of the site and/or the limits of the site. If the site is composed of more than one separate area, provide coordinates for each of these areas.

4°42'E 5°47'N (Latitude 4,70 and Longitude 5,79, in decimal degrees)

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9. General location:
Include in which part of the country and which large administrative region(s) the site lies and the location of the nearest large town.

The Apoi Creek Forests is located in Bayelsa State (carved out of the former River State), in the central Niger Delta. It is located in the old Koluama Divison (latter Southern Ijaw Local Government Area, then Apoi/Olodiama LGA) and bounded by Gharan and Paratubo to the North, Okubie and Lobia to the East, Apoi Creek to the South and Pennington River to the West.

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10. Elevation: (in metres: average and/or maximum & minimum)
2-4.5 m

11. Area: (in hectares)
29 213 hectares

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12. General overview of the site:
Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

Located in Central Niger Delta, Apoi Creek Forests is mainly of marsh and mangrove forests as well as fresh water swamps. It is very significant due to the presence of populations of fauna life, most particularly the endemic Niger Delta Red Colobus monkey.

The Apoi Creek is a tidal freshwater, lowland swamp-forest that is nearly always flooded. The forest is dense and rich in several ecologically and economically valuable flora and fauna. The ecological functions it performs include flood control, water purification and nutrient cycling. It is also a habitat for flora and fauna of conservation concern, in addition to serving as an important spawning and nursery ground for fish resources. It contributes to local livelihoods through the provision of non-timber forest products NTFPs and subsistence fishery. It also contributes to sequestration of carbon produced by gas flaring.

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13. Ramsar Criteria:

Tick the box under each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11). All Criteria which apply should be ticked.

1	2	3	4	5	6	7	8	9
☑	☑	❑	❑	❑	❑	☑	❑	❑

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14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Criterion 1:

The Niger Delta is one of the most biologically diverse ecozones in the World as recognised by WWF's Global 200 Eco-regions. Within the Niger Delta, Apoi Creek is one of the major critical sites for biodiversity. The area includes representative areas of common-to-the-area but not protected mangrove forests and marsh forests, and fresh water swamp forests. As part of the Niger Delta habitat, the deltaic habitats, including braided channels, coastal lakes and mangroves, provide a variety of habitats for fresh water, brackish and marine species. Large congregations of water birds also distinguish the river delta (e.g. Hartlub's duck (*Pteronetta hartlaubi*), Pygmy goose (*Nettapus coromandelianus*) and fin foot (*Podica senegalensis*)).

Criterion 2:

The area supports the endangered red Colobus monkey (*Procolobus badius*) and the site includes a study area of about 140 ha established for this species.

Other threatened species include the vulnerable African Dwarf Crocodile (*Osteolaemus tetraspis*).

Some threatened plants include *Hallea ledermannii* (VU).

Much of the dry forest has been depleted due to logging; as the price of oil/gas and cost of living increase, the pressure to log increase. Yet, many areas are still inaccessible and have flora and fauna worth protecting as they support endangered and threatened ecological communities.

Criterion 7:

Apoi Creek supports a reduced fish fauna comprising a minimum of 17 species representing 14 genera and 10 families. There is approximately 1 species per genus and 2 species per

family. These are all indices of low piscine biodiversity in Apoi Creek. The most diverse family is Cichlidae (23.5%), followed by Polypteridae and Aplocheilidae (17.6% each). Clariidae comprises 2 species while six families are monospecific. The richest genera are *Polypterus, Clarias* and *Epiplatys*, each consisting of 2 species; the remaining 11(78.6) are monospecific. A significant feature of the taxonomic composition is that fish taxa with accessory air-breathing organs dominate the fauna. This type of fish composition is typical of environments with permanent or periodic low dissolved oxygen levels.

Three species of Aplochelids namely *Aphyosemion gardneri, Epiplatys sexfasciatus* and *Epiplatys grahami* are important ornamental fishes as well as indicators of relatively stable swampforest ecosystem.

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15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):
Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

This site falls under the Large River Deltas eco-region, specifically the Niger Delta.

a) biogeographic region:

Niger River Delta- Nigeria (Afrotropical)

b) biogeographic regionalisation scheme (include reference citation):

Congolian Coastal forest (Olson and Dinerstein, 1998) or Guinea- Congo Forest (Fishpool and Evans, 2001)

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16. Physical features of the site:
Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Some mangrove areas to the south of the Reserve
A broad saltwater/freshwater transition zone
Bulk of reserve: fresh water alluvial plain (the meander belt zone)

The soil type is mainly sandy soil on levees with more loam in the back-swamps. In the mangroves, the soil is chikoko mud.

River-bank levees on which people live and small farms are developed; back-swamps which are seasonally inundated; elevated patches of high dry forest.

There is a long (March-November) rainy season and a dry season (December to February). Temperature: 26-34°C. Lowest temperatures associated with June/July rains and harmattan (November-December); highest temperatures in February and September.

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17. Physical features of the catchment area:
Describe the surface area, general geology and geomorphological features, general soil types, and climate (including climate type).

The fresh water alluvial soils include levee-crest soils, levee-slope soils, flood plain soils, back-swamp soils. The levee rest soils are the least flooded and thus most towns and villages in the delta are located on them. These levees and their soils are well above water level (8m or more) for most part of the year with dept to groundwater table of about 3m or more. Levee crest soils carrying texture ranging from coarse sandy laoms through fine sandy/silt to varying mixtures of clay. This rather fine texture gives them low permeability, thus downward movement of water after rains is slow, causing ponding. Surface soil colours are dark grayish brown to light grayish brown. Strongly acid and low in organic matter, nitrogen and sometimes phosphorus. The levee soils are the main agricultural soils of the Niger Delta.

The levee slope soils occur at the back slope of the levee between the levee crest and the flood plains. Some are submerged at the peak of heavy floods up to 2m or more. Levee slope soils are less sandy than the levee crest soils. Textures from fine sandy to clay loam.

Obot: Apoi Creed to Penington River falls entirely within the black-water sector of the marsh forest zone between Bomadi and Apoi. The distinguishing feature of the area seems to be its highly seasonally stable hydrology (Powell 1997).

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18. Hydrological values:
Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

The swamps and creeks and drainage canals stabilize the island and prevent river bank erosion except in years with particularly heavy rainfall. The swamps and heavy annual rains are important to ground water recharge.

The hydrological functions it performs include flood control, water purification and nutrient cycling

Sediment trapping from the Nun River which flows from the River Niger and Benue is important to agriculture and fisheries.

The entire delta has a complex and generally efficient groundwater recharge system which includes horizontal as well as vertical recharge. The quantity of groundwater is not the problem; the quality is a problem due to the absence of iron.

Groundwater recharge in the freshwater swamps is efficient. There is generally a stable hydrology, with occasional years where heavy flooding destroys levee communities and erodes riverbanks.

Local engine boat and canoe navigation through waterways is the major transportation system.

As part of the Niger River Delta, the rivers slow and deposit sediment over their flood plains before flowing into the ocean, thus creating vast expanses of silt deposition and a system of channels through an alluvial plain. Historically, the Niger River brought enormous amounts of nutrient-rich sediment from upstream areas to its delta, creating a highly productive

system. The back swamps of the fresh water swamp forest and mangrove swamps play a major role in the natural control of flooding in upstream forests and barrier island forests. They are important for the recharge of aquifers which exist at several level; the recharging is efficient and provides the only possible source of potable fresh water where swamps and floods and human activities pollute the surface water.

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19. Wetland Types

a) presence:
Circle or underline the applicable codes for the wetland types of the Ramsar "Classification System for Wetland Type" present in the Ramsar site. Descriptions of each wetland type code are provided in Annex I of the *Explanatory Notes & Guidelines*.

Marine/coastal: A • B • C • D • E • F • G • H • I • J • K • Zk(a)

Inland: L • M • N • O • P • Q • R • Sp • Ss • Tp Ts • U • Va •
Vt • W • Xf • Xp • Y • Zg • Zk(b)

Human-made: 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9 • Zk(c)

b) dominance:
List the wetland types identified in a) above in order of their dominance (by area) in the Ramsar site, starting with the wetland type with the largest area.

I, H, Xf, N, M, Sp, 1, 9

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20. General ecological features:
Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

A larger portion of the site is mangrove swamp. There are also portions of coastal freshwater swamps supporting timber species such as *Uapaca spp*. Non-timber forest products such as Raphia palm and Irvingia are common.

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21. Noteworthy flora:
Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 14, Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS*.

About 240 plant species have so far been recorded in Apoi Forest. The flora is typically marsh and mangrove fotests and freshwater swamps with some remaining high trees. Plan lists in Were, L. Ecology and Conservation of the Niger Delta Red Colobus. (put in bibliography)

Werre: The flora of the delta definitely requires further investigation. Even though most of the tree species found in the delta occur along the West African coast, the delta's faunal assemblages appear to be unique. The vegetation analysis conducted for this study attests to this since it contains a number of tree species which were previously hardly known, or only known east of the Cross River.

Obot: Red mangroves (Rhizophora) characterize the mangrove areas. There are also timber species such as Nauclhea, Uapaca, etc. in the freshwater swamps.

Rare Nigerian trees found in the area include *Xylopia staudtii, Cercestis afzelii, Uapaca palaudosa, Pterocarpus soyauxii,* etc.

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22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Biodiversity mainly of swamp species: buffalo (*Syncerus caffer*). Black fronted duiker (*Cephalophus nigrifrons*), sitatunga (*Tragelaphus spekii*), Maxwell's duiker (*Cephalophus maxwellii*), water chevrotain (*Hyemoschus aquaticus*), tree pangolin (*Manis tricuspis*), leopard (Panthera pardus).

Grey parrot, herons, black kite, Hammerkop, Hartlaub's duck, pygmy goose, finfoot.

Werre's work is perhaps one of the most locally intensive and specific wildlife and habitat studies done in the Niger Delta. His report on the red colobus and on human activities and their environmental effects is informative when considering the future of this and other sites.

Apoi Creek supports a reduced fish fauna comprising a minimum of 17 species representing 14 genera and 10 families. There is approximately 1 species per genus and 2 species per family. These are all indices of low piscine biodiversity in Apoi Creek. The most diverse family is Cichlidae (23.5%), followed by Polypteridae and Aplocheilidae (17.6% each). Clariidae comprises 2 species while six families are monospecific. The richest genera are *Polypterus, Clarias* and *Epiplatys*, each consisting of 2 species; the remaining 11(78.6) are monospecific. A significant feature of the taxonomic composition is that fish taxa with accessory air-breathing organs dominate the fauna. This type of fish composition is typical of environments with permanent or periodic low dissolved oxygen levels.

Key herpetofauna include the Nile crocodile. Close to 100 bird species including five of global conservation concern occur in the area. Apoi Creeks remain one of the habitats for populations of the highly endangered Niger Delta red colobus monkey. There are indications for the presence of Chimpanzee populations and the endemic Sclater's guenon

Three species of Aplochelids namely *Aphyosemion gardneri*, *Epiplatys sexfasciatus* and *Epiplatys grahami* are important ornamental fishes as well as indicators of relatively stable swampforest ecosystem. Nile crocodile *Crocodylus niloticus* occur in the area. White-crested Tiger Heron (DD; IUCN & BirdLife International) Hartlaub's duck *Pteronetta hartlaubii* (NT; IUCN & BirdLife International), African Skimmer (NT; IUCN & BirdLife International), Great Snipe (NT; IUCN & BirdLife International) and Grey Parrot (Schedule 1 Species Nigeria's CITES Act 11 of 1985). It is the stronghold of the endemic Niger Delta Red Colobus.

A large number of resident bird species are recorded in Apoi Creek. Important Waterbirds include African Pygmy goose *Nettapus auritus* and African finfoot *Podica senegalensis.*

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23. Social and cultural values:

a) Describe if the site has any general social and/or cultural values e.g., fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values:

Extensive fisheries and fish production.

Logging and hunting are moderate because the terrain makes extraction difficult; exploiting is mainly indigenous. A canal has been dug by loggers from Apoi Creek to Pennnington River to move out logs. Local people produce salt in the mangrove and fish in the creeks using a variety of methods. They gather ogbono (*Irivingia gabonensis*). Some small cassava and plantain farms exist.

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning?

If Yes, tick the box ❑ and describe this importance under one or more of the following categories:

i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:

ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:

iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:

iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

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24. Land tenure/ownership:

a) within the Ramsar site:

Current land tenure decree places ownership of the entire area in the Federal Government. The Decree is controversial and use of land still requires consent and cooperation of the indigenous people. All land and swamps are owned by families and/or a community. Land is considered very important to communities and fallow systems for levee agriculture are often followed.

b) in the surrounding area:

current land tenure decree places ownership of the entire area in the Federal Government. The decree is controversial and use of land still requires consent and cooperation of the indigenous people who know “who owns what” with respect to every swamp and waterway.

Sections of the forest are owned by families. There are a few small sacred forests; these are owned by the community.

Obot: there is a mixture of customary and institutional ownership. The Rivers State Government has surveyed the site for possible gazzetment as a conservation area. However, the ownership of land and land use rights are still claimed by the local communities. Fishing rights and exploitation of forest products largely follow normal customary arrangement in each of the village communities.

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25. Current land (including water) use:

a) within the Ramsar site:

Logging, fishing, gathering of mangrove firewood and other non-timber forest products. Snail trapping, mat weaving, thatch making, canoe carving and sewing. Waterways are only means of transportation.

b) in the surroundings/catchment:

forest being logged, though terrain makes extraction difficult. Hunting moderate presumably for the same reason. Exploitation is mainly indigenous. Canal from Apoi Creek to Pennington River for logs. Local people produce salt in mangrove and fish in the creeks. They gather ogbono, cut abura leaves and have small plantain farms.

Logging, fishing, gathering of mangrove firewood and other non-timber forest products. Water ways are the only means of transportation.

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26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

a) within the Ramsar site:

some parts are heavily logged with canals dug for floating logs to larger rivers.

b) in the surrounding area:

Same as above! In addition, there are some oil industry activity which involve gas flaring, dredging of larger rivers, oil spillages.

Obot: the creek is supposed to be hydrologically stable seasonally providing a permanent/semi-permanent condition for fish spawning areas to retain water. Canals are already being dug for the purpose of timber extraction. This is adversely impacting on the hydrological system, causing much part of the site to remain dry at some times of the year. This has negative effects on fish production and gives further access for forest devastation.

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27. Conservation measures taken:

a) List national and/or international category and legal status of protected areas, including boundary relationships with the Ramsar site:

In particular, if the site is partly or wholly a World Heritage Site and/or a UNESCO Biosphere Reserve, please give the names of the site under these designations.

NA

b) If appropriate, list the IUCN (1994) protected areas category/ies which apply to the site (tick the box or boxes as appropriate):

Ia ❑;Ib ❑; II ❑; III ❑; IV ☑; V ❑; VI ❑

c) Does an officially approved management plan exist; and is it being implemented?:
No

d) Describe any other current management practices:

Research on the Niger Delta Red Colobus monkey and its habitat has been carried out by L. Werre in the forest outside Gbanaraun at the periphery of the Apoi Creek. Werre has established a field camp and employed community assistance, thereby initiating protection of the species from hunting in the area.

Under a 3-year programme (2002-2005), sponsored by the MacAuthur Foundation, Niger Delta Conservation for Sustainable Development (ND-CSD), Niger Delta Wetlands Centre worked with the host community of Gbanraun as a means of getting them to protect the forest where the Red Colobus monkey protection was started by Werre. A sustainable livelihoods assessment and natural resources management plan were part of the process following which NDWC paid for park monitoring and maintenance of the field station; it also worked with the community to establish a solar-powered water system of the field station which provides the only potable water in the area. Since the project ended (with a 1-year extension) in 2006, no funds have been available to sustain protection or monitor the water system.

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28. Conservation measures proposed but not yet implemented:
e.g. management plan in preparation; official proposal as a legally protected area, etc.

Management plan in preparation.

Obot: following Werre's work and preliminary survey of Apoi Creek, it has been recommended that a management plan for the conservation of the larger Apoi Creek Conservation area be designed. It has also been recommended that the entire area be subjected to a more comprehensive study of biodiversity to confirm the population structure of the Niger Delta Red Colobus monkey and other endemic and endangered animal species in the area.

The presence of marsh, mangrove and freshwater swamp forest as represented in Apoi Creek Forest make this area attractive for conservation.

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29. Current scientific research and facilities:
e.g., details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

L. Were's report on the Niger Delta Red Colobus monkey is completed with a base camp established near Gbanraun. A general study of the potential conservation sites in the Niger Delta (Apoi Creek included) was carried out by the Niger Delta Wetlands Centre in collaboration with the Federal Ministry of Environment. (Late Professor Powell of the River

State University also did extensive field work on the wildlife of the Niger Delta; including the Apoi Creek Forests). Werre's 140 ha research site has some local protection.

It is highly recommendted that the work started by Lodewijk Werre to protect the Red Colobus monkey be continued. Immediate action should be taken to establish the protected area as a sanctuary, while devising a management plan for staged extension of protection of the larger Apoi Creek Forest Reserve area. It is also recommended that the entire Apoi Creek Forest Reserve, as a surveyed area, be subjected to biodiversity and habitat studies to endangered species and their habitats. Presence of marsh, mangrove and freshwater swamp forest in Apoi Creek make this area attractive for conservation.

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30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:
e.g. visitors' centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

Not much has been achieved on environmental Education in Apoi Creek. The community support provided by L. Werre's work in Gbanraun provided some awareness on the need for forest protection and most particularly the importance of the Red Colobus monkey. The awareness building and resource management planning of the ND-CSD project also build awareness within the community but implementation of resource management plans has not been achieved. Niger Delta Wetlands Centre continues the work started on the ND-CSD project on a skeletal basis, in order to keep in touch with the Gbanraun community.

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31. Current recreation and tourism:
State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

No information available.

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32. Jurisdiction:
Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept of Agriculture/Dept. of Environment, etc.

Obot: Mainly falls on the Bayelsa State Government's Ministry of Environment and Natural Resources and local community people of Gbanraun and other villages.

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33. Management authority:
Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Obot: Bayelsa State, Ministry of Environment and Natural Resources

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34. Bibliographical references:
Scientific/technical references only. If biogeographic regionalisation scheme applied (see 15 above), list full reference citation for the scheme.

FEPA, 1995. Sites of Conservation Potential in the Niger Delta. A study carried out by the Niger Delta Wetlands Centre.

Powell C. P., 1997. Zonation and Protected Areas of the Niger Delta. A paper presented at a Technical workshop of the Niger Delta Wetlands Centre.

Powell C.P., 1995. Wildlife Study of the Niger Delta. A paper submitted to Environmental Affairs Department of SPDC.

RSUST, 1982. Flood control and impact of canalization in the Apoi/Gbanraun Creek region. A fieldwork report.

Werre L., 1997. Ecology and conservation of the Niger Delta Red Colobus. A report for general reference preliminary to completion of detailed technical information in Werre's Ph.D. thesis.

Please return to: **Ramsar Convention Secretariat, Rue Mauverney 28, CH-1196 Gland, Switzerland**
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